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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
SHEVIN, MARK L	

ART UNIT	PAPER NUMBER
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,154	BOGER ET AL.	
	Examiner	Art Unit	
	MARK L. SHEVIN	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-6,15,19,35,36 and 39-41* is/are pending in the application.

4a) Of the above claim(s) *7-14,16-18,20-34,37 and 38* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 4-6, 15, 19, 35, 36, and 39-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Acknowledgement of RCE

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 19th, 2010 has been entered.

Status of Claims

2. Claims 1 and 4-41, filed February 19th, 2010 are pending. Claims 1 and 39 are amended, claims 7-14, 16-18, 20-34, and 37-38 are withdrawn, and claims 2-3 are canceled.

Status of Previous Rejections

3. The previous rejection of claim 1 under 35 U.S.C. 112 (1st paragraph) in the Office action dated November 19th, 2009 has been withdrawn in view of the amendments to claim 1.

4. The previous rejection of claim 1 under 35 U.S.C 112 (2nd paragraph) in the Office action dated November 19th, 2009 has been withdrawn in view of the amendments to claim 1.

5. The previous rejection of claim 39 under 35 U.S.C 112 (2nd paragraph) in the Office action dated November 19th, 2009 has been maintained.

Claim Rejections - 35 USC § 112, 2nd Paragraph

6. **Claim 35** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 35, the term "few" in claim 35 is a relative term which renders the claim indefinite. The term is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 103

7. **Claims 1, 4, 15, 19, 35, 36, 39, and 41** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Peng** (CN 1413797 – Full Translation) in view of **Ishii** (US 5,916,635).

Peng:

Peng discloses a method of soldering aluminum and copper pipes together using an active connection agent prepared from nanometer powder which was added to water, organic cellulose, and flux through mixing. Thus nanoparticles are added to a base material to produce a non-corrosion flux. The nanoparticles has a size range of 20 nm - 100 μm (claim 2). The active bonding agent of Peng's invention includes nanopowder, a non-corrosive flux, and a binder (p. 5, para 2) and the material is designed for brazing (p. 7).

Peng is silent as to the volume percentage and particular type of the nanoparticles in the brazing flux material.

Ishii:

Ishii is drawn to producing hydrophilic coatings for the aluminum fins of heat exchangers (Abstract). Such hydrophilic coatings are used to let condensing water spread out over the surface of fins rather than forming globules which increase resistance to air flow and lower heat exchanger efficiency (col. 1, lines 20-35).

Hydrophilic coatings are produced by spreading a mixture of colloidal silica (Silicon dioxide, SiO_2), water-soluble polymers, and anionic surfactants over aluminum fins and drying by heating (col. 3, lines 1-10). The colloidal silica may be alkali-stabilized silica with a particle diameter of 5 to 100 nm, preferably 10 to 30 nm (col. 3, lines 19-25).

The total weight of the polymer and silica nanoparticles in the mixture is 4 to 20 wt% (col. 3, lines 9-10).

Regarding claims 1 and 15, Peng discloses a non-corrosive (claim 1), brazing flux (p. 7) with activated nanopowder of 20 nm - 100 μm size (claim 2) with a binder of water and organic cellulose (claim 3). The binder is a "base material", the activated nanopowder are “nanopowders” and the “nanoparticles are dispersed in an organic polymer" as cellulose is an organic polymer and as it is a binder, the nanoparticles are therefore dispersed in it.

It would have been obvious to one of ordinary skill in fluxes, at the time of the invention, to have modified Peng in view of Ishii to include from 0.01 to 10 vol% of

nanoparticles such as silica (SiO_2) as Ishii taught that the inclusion 4 – 20 combined weight percent of colloidal silica nanoparticles and polymer in a coating composition for aluminum materials that are heated, just as with Peng's brazing flux, and Ishii taught that such silica nanoparticles allow the formation of hydrophilic coatings that condensing water spread out over the surface of heat exchanger fins rather than forming globules which increase resistance to air flow and lower heat exchanger efficiency (col. 1, lines 20-35).

Ishii taught that the total weight of polymer and nanoparticles should be in the range of 4 to 20 wt% and the Examiner holds that the content of nanoparticles and residual polymer would overlap the claimed ranges of 0.01 to 10 vol% and 0.1 to 1 vol% when converted to volume percent.

It would have been obvious to one of ordinary skill in fluxes, at the time of the invention, to select any portion of the claimed range of nanoparticle volume percentages, including the claimed range, from the overlapping range of nanoparticle and polymer content disclosed in Ishii because Ishii finds that the prior art composition in the entire disclosed range has a suitable utility (coating composition for Al material and for heat exchangers in particular) and the normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages."); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). From MPEP § 2144.05: In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Wertheim*, 541

F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

With respect to the recitation of claim 1 stating: "...for the brazing of individual heat exchanger parts...", this addition is intended use as it does not limit the structure of the claimed flux beyond the explicit contents of nanoparticles, base material, and the state of dispersion of the nanoparticles.

With respect to the amendment claim 1 adding "...wherein the comprise nanoaggregates dispersed in an organic polymer", Peng's nanoparticles are dispersed in an organic polymer of cellulose and Ishii's nanoparticles of silica are dispersed in a water-soluble polymer of the carboxylic group (col. 3, lines 18-67), both of which are organic polymers. Furthermore, Ishii discloses an overlapping total content of polymer (col. 3, lines 9-10). From these similarities in composition of the flux, one of one of ordinary skill in the fluxes would have reasonably expected that the flux of Peng in view of Ishii contain at least some nanoaggregates formed from the constituent nanoparticles ("comprise nanoaggregates).

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. Furthermore, "when the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not" and "the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her]

claimed product. Whether the rejection is based on 'inherency' under 35 U.S.C. 102, on '*prima facie* obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same..." (MPEP 2112, section V, para 1).

Regarding claim 4, this claim is rejected for the same reasons as stated for claims 1 and 15 above, in that Ishii taught that the total weight of polymer and nanoparticles should be in the range of 4 to 20 wt% and the Examiner holds that the content of nanoparticles and residual polymer would overlap the claimed ranges of 0.01 to 10 vol% when converted to volume percent, and it would have been obvious to optimize within the disclosed ranges of polymer and nanoparticles per MPEP 2144.05.

With respect to the amendments to claim 4, these amendments do not change the scope of the claims and thus the previous rejection still stands.

Regarding claims 19 and 39, Ishii taught the inclusion of silica nanoparticles, which is an oxide of silicon, and thus are "oxides" in the Markush group of claim 39.

With respect to the amendment to claim 19 changing the dependency, claim 39 is rejected as Ishii taught the inclusion of oxide nanoparticles.

Regarding claims 35 and 36, it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed size ranges of nanoparticles through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. Peng disclosed the nanoparticles as being in the range of 20 nm - 100 nm (claim 2) but did not give reasons for this size range while Ishii taught that the nanoparticles should be in the range of 5 nm (reads on

'few nanometers') – 100 nm because the particles agglomerate below about 5 nm and adversely affect the stability of the coating composition when larger than 100 nm (col. 3, lines 1-35).

Regarding claim 41, this claim is rejected for the same reasons as stated for claim 4above, in that Ishii taught that the total weight of polymer and nanoparticles should be in the range of 4 to 20 wt% and the Examiner holds that the content of nanoparticles and residual polymer would overlap the claimed ranges of 0.1 to 1 vol% when converted to volume percent, and it would have been obvious to optimize within the disclosed ranges of polymer and nanoparticles per MPEP 2144.05.

8. **Claims 5, 6, and 40** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Peng** in view of **Ishii** as applied to claims 1, 4, 15, 19, 35, 36, 39, and 41 above, in further view of **Englert** (EP 1287941 – Full translation).

The disclosures of Peng and Ishii were discussed above, and while Ishii teaches synthetic resins (col. 4, lines 4-10), he also teaches that such polymer components undergo excessive curing and become fragile after heating above 280 °C (col. 7, lines 15-26). Furthermore, neither Peng nor Ishii teach the precise composition of the flux.

Englert:

Englert addresses these deficiencies and is drawn to a flux composition for brazing of aluminum parts (Title and para 0001). The preferred flux is NOCOLOK™ a potassium fluoroaluminate, preferably $K_{1-3}AlF_{4-6}$ in the form of a eutectic with a melting point of 562-572 °C (para 0003 and 0018). The flux is mixed with a solvent and binder

where the binder is a polymer such as polyurethanes, synthetic resins, phthalates, acrylates, vinyl resins, or polyolefins and the binder is present between 0.1 and 30 wt% (para 0016 and 0020). The advantage of using Englert's inventive flux is that it overcomes the problems associated with fluxing of aluminum-based parts for soldering, such as post-fluxing cleaning (para 0006-0008).

Regarding claim 5, it would have been obvious to one of ordinary skill in fluxes, at the time the invention was made, to combine Peng in view of Ishii and Englert to form a flux with nanoparticles that includes a polymer that can withstand the demands of brazing as Ishii teaches that his polymeric binders will have poor results after heating to normal brazing temperatures and thus one would look to modify Ishii by looking to other polymeric binders for use in a brazing flux composition as taught by Englert and reinforced by Peng's disclosure of nanoparticles in a flux composition. Englert teaches that his flux including polymeric binders is used for brazing of aluminum at temperatures of above 450 °C and preferably above 560 °C. Englert discloses polyurethanes, synthetic resins, phthalates, acrylates, vinyl resins, or polyolefins, which are all members of the claimed Markush group.

With respect to the amendment to claim 5 changing the dependency, the rejection of claim 1 was based on Peng in view of Ishii to yield a brazing flux with the required volume percent of nanoparticles and Englert is used to modify the brazing flux of Peng in view of Ishii to include any one of the claimed binders to improve performance when brazing aluminum as is sought by Peng.

With respect to the amendment to claim 5 adding that the polymer used is "organic", Englert's polyurethanes, synthetic resins, phthalates, acrylates, vinyl resins, or polyolefins are all organic polymers as they have carbon (thus organic) and are members of the Markush group said to be all organic polymers.

Regarding claim 6, it would have been further obvious to one of ordinary skill in the art to chose a proven flux for aluminum in Nocolok ($K_{1-3}AlF_{4-6}$) as disclosed by Englert as Englert teaches that his flux for brazing aluminum overcomes the prior art problems associated with fluxing of aluminum based parts for brazing.

Regarding claim 40, this claim is rejected for the same reasons as claim 5 above because Peng in view of Ishii was used to reject claim 39 as Ishii taught the inclusion of nanoparticles of oxide in using silica nanoparticles while the instant rejections use Englert to modify the brazing flux of Peng in view of Ishii to include any one of the claimed binders to improve performance when brazing aluminum as is sought by Peng.

Response to Applicant's Arguments:

9. Applicant's arguments filed February 19th, 2010 have been fully considered but they are not persuasive.

Applicants assert (p. 7, final para to p. 8, para 1) that one of ordinary skill in the art would understand the meaning and scope of claim 35.

In response, the portions of the instant specification cited in Applicants remarks do not clarify the meaning of "a few nanometers" as these sections again only mention a few nanometers as a size range. Furthermore, claim 36 does not provide a basis for

interpreting claim 35 as these claims do not depend on one another and only serve to limit the scope of independent claim 1.

Applicants assert (p. 8, para 5 to p. 9, para 3) that neither Peng nor Ishii discloses the limitations required by the amendment to claim 1.

In response, with respect to the amendment claim 1 adding "…wherein the comprise nanoaggregates dispersed in an organic polymer", Peng's nanoparticles are dispersed in an organic polymer of cellulose and Ishii's nanoparticles of silica are dispersed in a water-soluble polymer of the carboxylic group (col. 3, lines 18-67), both of which are organic polymers. Furthermore, Ishii discloses an overlapping total content of polymer (col. 3, lines 9-10). From these similarities in composition of the flux, one of one of ordinary skill in the fluxes would have reasonably expected that the flux of Peng in view of Ishii contain at least some nanoaggregates formed from the constituent nanoparticles ("comprise nanoaggregates).

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. Furthermore, when the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not, as set forth in the rejection supra.

Conclusion

-- Claims 1, 4-6, 15, 19, 35-36, and 39-41 are rejected
-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Mark L. Shevin/
Examiner, Art Unit 1793

10-562,154
April 15th, 2010

/George Wyszomierski/
Primary Examiner
Art Unit 1793